

Lower Passaic River: A Plan to Expedite Cleanup of the Upper 9-Miles

November 2, 2017

Meeting Goals

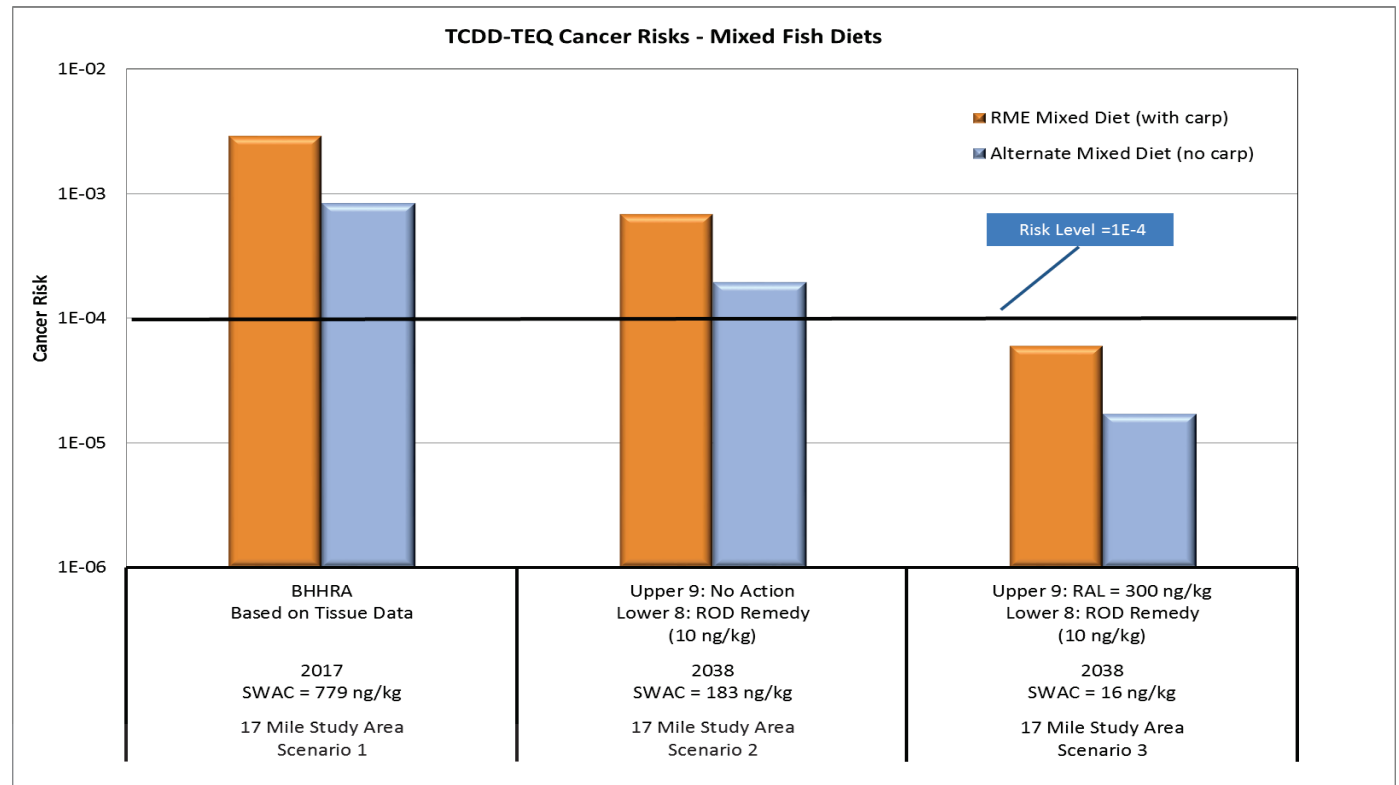
- Address EPA's questions from the October 4 meeting
- Agree to move forward with the Phase 1 Interim Remedy with Adaptive Management
- Agree to develop Legal & Administrative Framework

CPG's Proposal for an Upper 9- Mile Phase 1 Interim Remedy

- Phased approach to address the Upper 9-Miles using Adaptive Management
- Proposed RAL of 300 ppt TCDD and 1 ppm of Total PCBs
- Approximately 80 Acres from RM 8.3 to RM 14.7
- Remedial Footprint will be reassessed after the PDI
- Performance Monitoring will be used to determine whether additional actions are required or a final ROD can be issued

Threshold
Issue:
Phase 1
Interim
Remedy will be
Protective

TCDD Risks: Current versus Post-Lower 8-Mile Remedy & Upper 9-Mile Interim Remedy in 2038



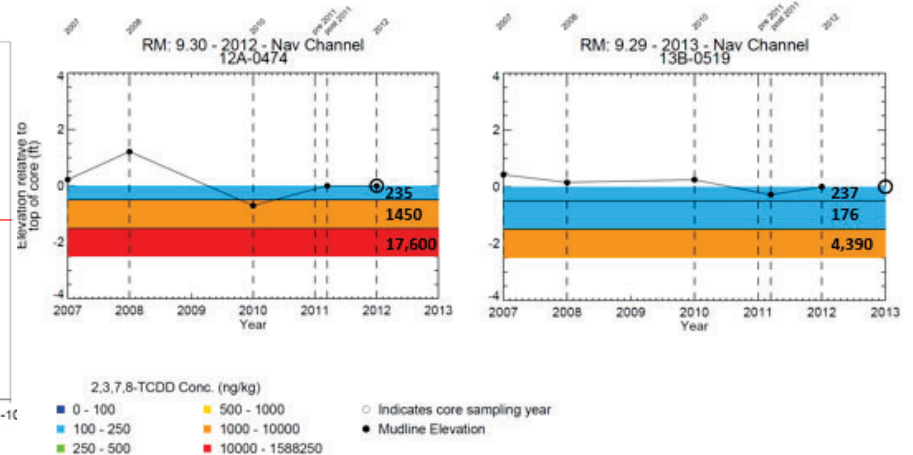
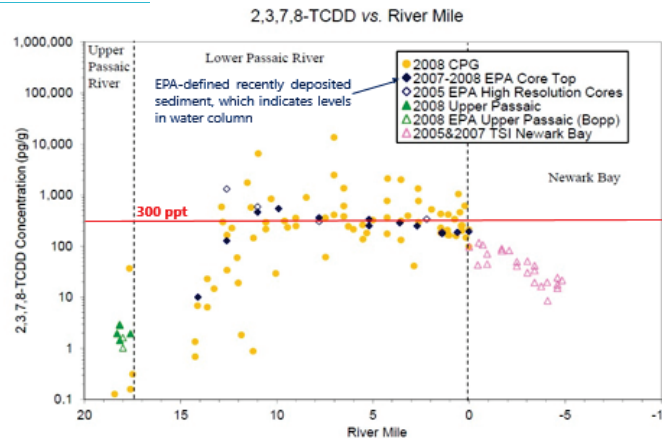
Why Should EPA Care?

- Proposed Remediation meets Risk Threshold.
- Adaptive Management provides certainty of meeting final risk goals
- Allows coordination with Lower 8-mile Remedial Action
- The Entire 17-miles will be addressed years sooner potentially completing the clean-up in the mid-to-late 2020s

The CPG Plan: An Overview

- Clean Up the Sediment Posing the Greatest Risks or Preventing the Rest of the River from Recovering (ROD 1)
- Monitor Fish, Crab, Water and Sediment to Make Sure the Cleanup is Working
- If the Cleanup isn't Doing Enough, Go Back Into the River and Do More (ROD 2)

How Did We Develop & Refine the Plan?



- Developed RALs to Address Sediment not recovering or inhibiting recovery of the rest of the river
 - Indicated by surface sediment concentrations greater than concentrations in the water column & recently deposited sediments
 - Results:
 - Inhibited recovery indicated by surface concentrations > 400 ppt
 - Sediments in 200-400 range keeping track with changes in water column
 - Sediments < 200 largely sandy or gravelly with some fine material that can be subject to erosion and replacement (thus recovering as water column drops)
- EPA demonstrated value of incorporating RM 12.5 to RM 14.7
 - Achieves greater SWAC reduction

Acreage Targeted for Tested RAL Options

2,3,7,8-TCDD RAL (ng/kg)				RM 8-14.7 Acreage	
Limited Deposition/ Some Erosion	Erosion > 6 inches	Direct Contact Areas	Other Areas	CS 37	range
300	300	300	300	83	67 - 94
250	250	300	300	84	70 - 96
200	200	300	300	86	72 - 99
200	200	300	500	84	71 - 97
200	200	250	500	85	72 - 98
200	200	200	300	89	75 - 102

2,3,7,8-TCDD RAL (ng/kg)			RM 8-14.7 Acreage	
Shoals	Erosion > 6 inches	Other Areas	CS 37	range
200	300	300	87	73 - 99
200	200	300	87	73 - 100
200	200	500	85	71 - 96

Post-Remedy SWACs & Percent Reductions for Tested RAL Options Based on CS 37

2,3,7,8-TCDD RAL (ng/kg)				RM 8 - 14.7				RM 8 – 17.4			
				2,3,7,8-TCDD		Total PCB		2,3,7,8-TCDD		Total PCB	
Limited Deposition/ Some Erosion	Erosion > 6 inches	Direct Contact Areas	Other Areas	SWAC	Percent Reduction	SWAC	Percent Reduction	SWAC	Percent Reduction	SWAC	Percent Reduction
300	300	300	300	84	91.5	0.30	79.7	62	91.5	0.29	74.7
250	250	300	300	82	91.7	0.30	80.0	60	91.7	0.29	75.0
200	200	300	300	79	92.0	0.29	80.4	62	91.5	0.29	74.7
200	200	300	500	87	91.2	0.30	79.8	64	91.2	0.29	74.8
200	200	250	500	82	91.7	0.29	80.2	60	91.7	0.29	75.2
200	200	200	300	71	92.8	0.28	81.2	52	92.8	0.28	76.2

2,3,7,8-TCDD RAL (ng/kg)			RM 8 - 14.7				RM 8 – 17.4			
			2,3,7,8-TCDD		Total PCB		2,3,7,8-TCDD		Total PCB	
Shoals	Erosion > 6 inches	Other Areas	SWAC	Percent Reduction	SWAC	Percent Reduction	SWAC	Percent Reduction	SWAC	Percent Reduction
200	300	300	70	92.9	0.28	81.1	52	92.9	0.28	76.0
200	200	300	70	92.9	0.28	81.1	51	92.9	0.28	76.1
200	200	500	74	92.6	0.29	80.6	54	92.6	0.28	75.6

Have not looked at variable PCB RALs

Post remedy SWAC with 1 ppm RAL driven to less than 0.3 ppm - Less than background concentration > 0.4 ppm

At EPA's Request:

Considered a Range of
2,3,7,8-TCDD RALS

- Analysis Supports Use of 300 ppt RAL
 - 300 ppt RAL reduces concentrations more than ten-fold
 - Reducing RAL to 200 achieves little additional benefit
 - Targets cores showing recovery potential
 - Produces unmeasurable changes in SWAC
 - mostly < 10 ppt
 - 300 ppt RAL is already conservative
 - Could raise to 400 ppt since water column concentrations 200 – 400 ppt

Range of Post-Remediation SWACs Within Range of Data Uncertainties

- CS 37 is One of 100 Conditional Simulations
 - +/-25% for total footprint acreage
 - Final footprint will be based on PDI results
 - Current data set and tools are not refined sufficiently to determine the difference between 40, 30, 20 or 10 ppt
 - Numerous Uncertainties in Sediment to Tissue Relationships
-
- Post-Remediation/Recovery SWACs are equivalent within accuracy of data
 - Only mechanism to evaluate effectiveness is to conduct Phase 1 Interim Remedy and monitor: Adaptive Management

EPA Evaluated Potential Recovery Following Phase 1 Removal

HDR Prediction Results - September 11, 2017

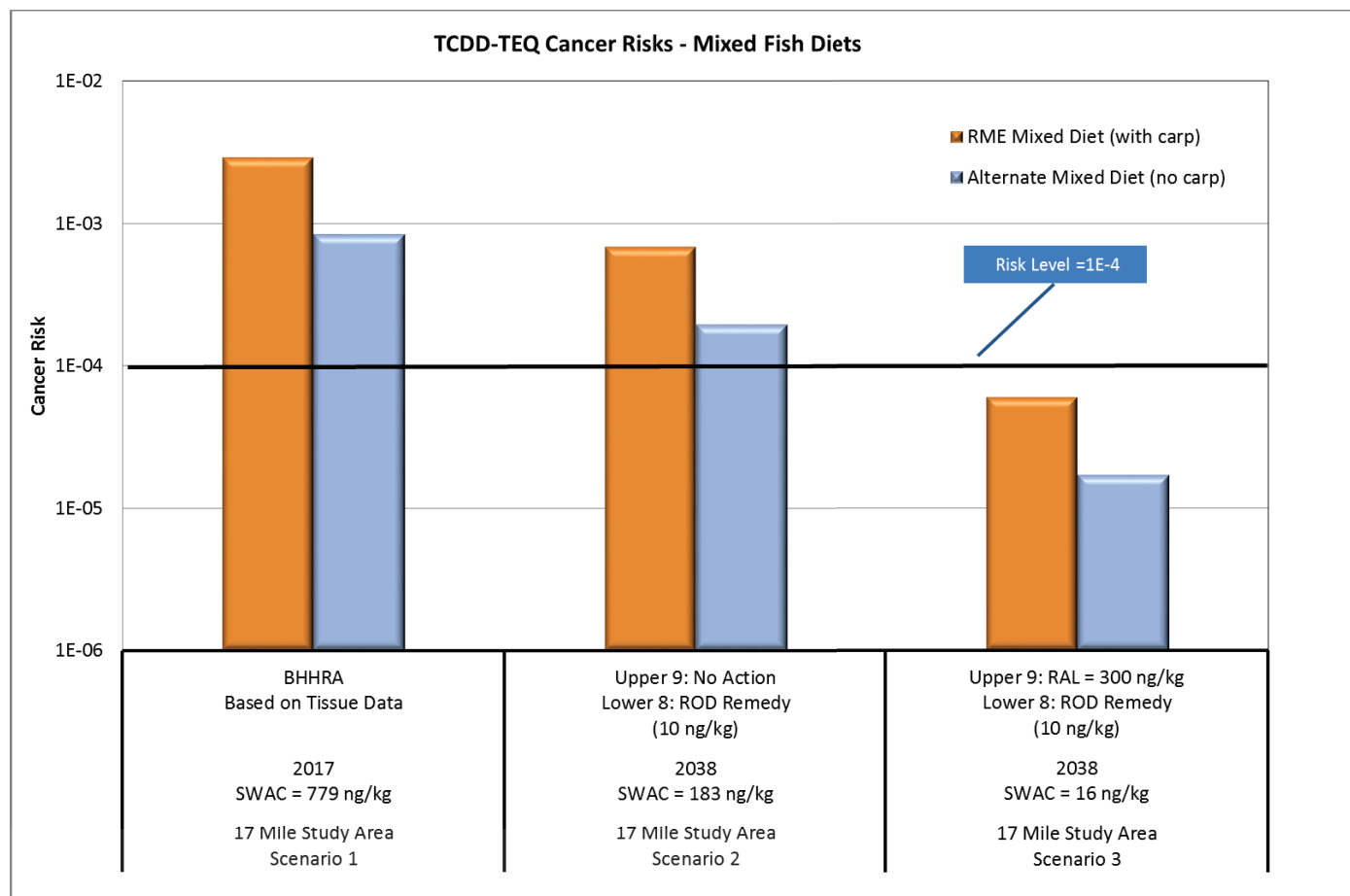
- RM8.3 – 17.4
 - 2038 TCDD concentration (after recovery): 27ppt
 - **96% reduction**
- RM8.3 - 14.8
 - 2038 TCDD concentration: 36 ppt
 - **96% reduction**
- Shoals, RM8.3 – 14.8 and RM8.3 - 17.8
 - 2038 TCDD concentration: 31 ppt
 - **97.5% reduction**

- Results show that the Phase 1 removal is likely to provide a substantial benefit to the river
- Supports projections that the removal will be protective

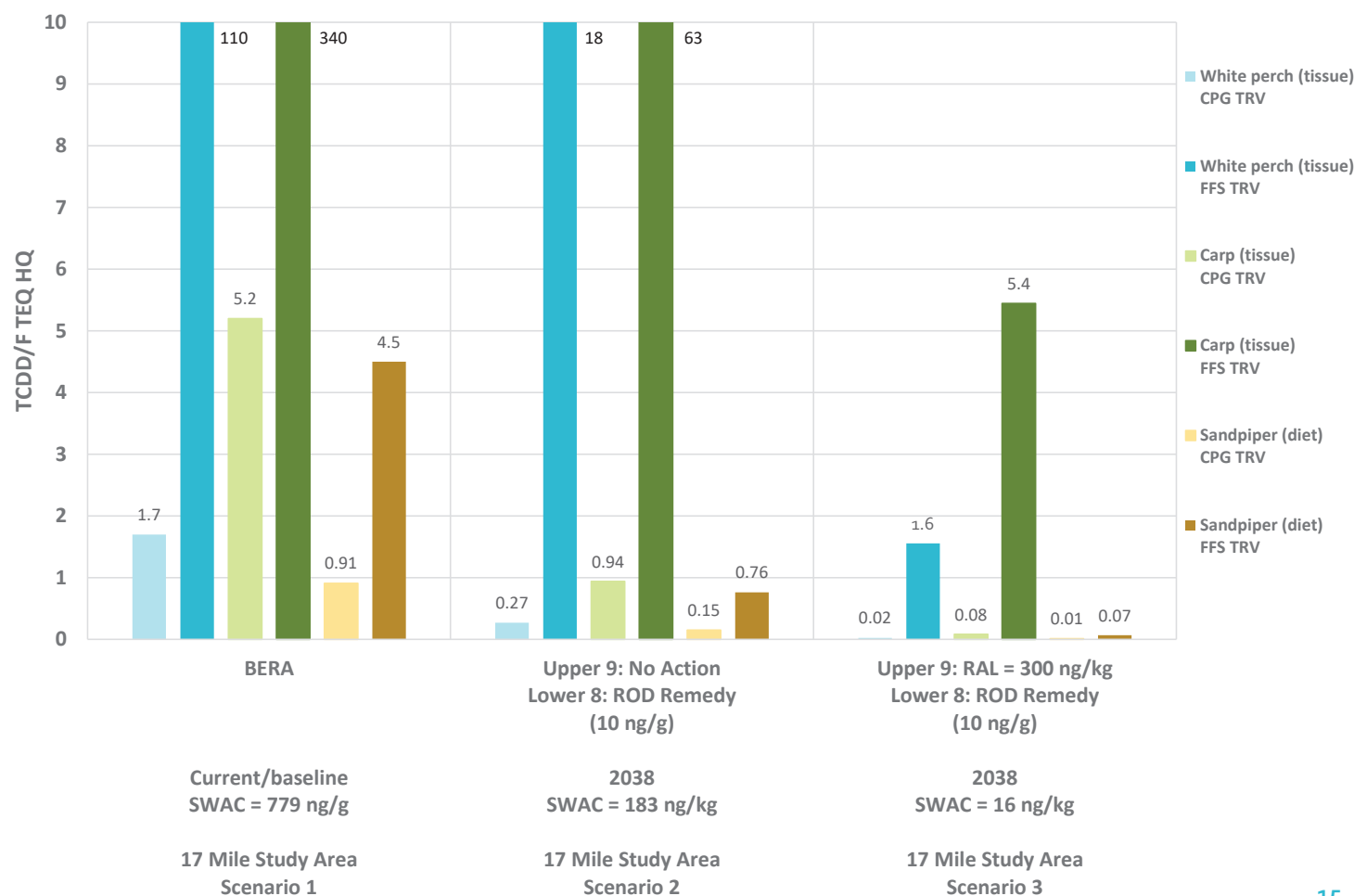
2,3,7,8-TCDD SWACs Used in Risk Reduction Calculations

Scenario Number	Scenario Description	2,3,7,8-TCDD SWAC (ng/kg)	Basis for SWAC Used
1	Current baseline conditions	779 ng/kg RM 0-17.4 SWAC	CPG Mapping of "2010" dataset (conditional simulation 37)
2	ROD remedy only (no action in the upper 9 miles)	183 ng/kg RM 0-17.4 SWAC	Area-weighted average of the following: <ul style="list-style-type: none"> For lower 8 miles, EPA ROD model prediction for 2038 for preferred remedy, based on 2016 ROD report figures (10 ng/kg). For upper 9 miles, EPA ROD model No Action simulation presented at the 9/11 Phase 1 meeting (511 ng/kg)
3	ROD remedy and Phase 1 remedy - Impact on site-wide risk	16 ng/kg RM 0-17.4 SWAC	Area-weighted average of the following: <ul style="list-style-type: none"> For lower 8 miles, EPA ROD model prediction for 2038 for preferred remedy, based on 2016 ROD report figures (10 ng/kg). For upper 9 miles, EPA ROD model 2038 prediction for a 300 ng/kg 2,3,7,8-TCDD RAL in the upper river, presented at the 9/11 meeting (27 ng/kg)

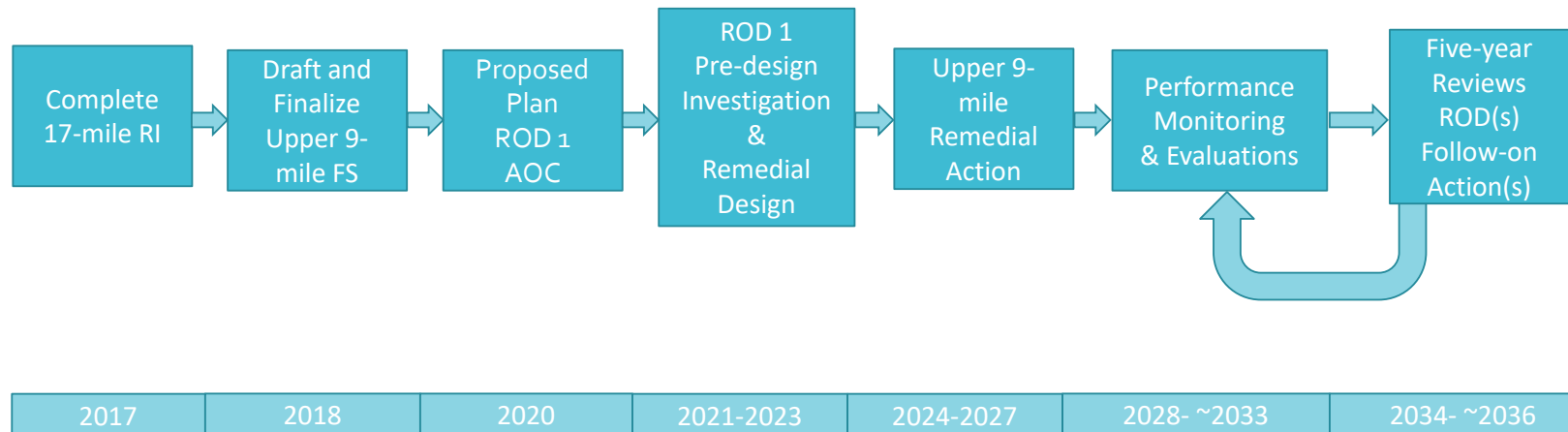
Cancer Risk Reductions – Adult & Child Angler



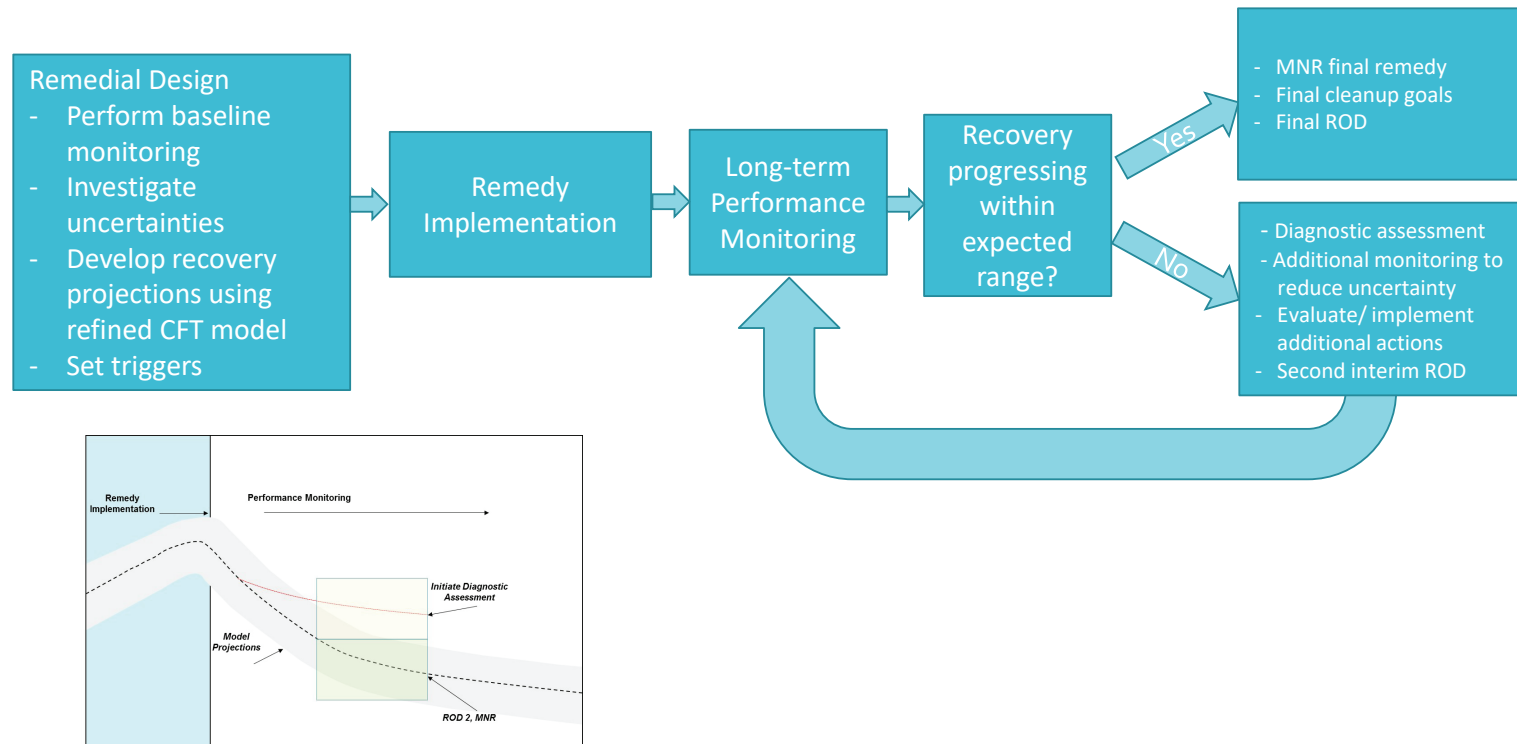
Ecological Risk Reductions – White perch (tissue) carp (tissue) & sandpiper (diet)



Upper 9-mile Plan – An Adaptive & Iterative Approach



Upper 9-mile Adaptive Management Process



Potential Monitoring in the Upper 9 Miles

Component	Baseline	Remedy Implementation	Year 0 Post- Construction	Long-term	
				Primary*	Diagnostic
Bathymetry	✓		✓	✓	
Water Column	✓	✓	✓	✓	✓
Biota	✓	✓	✓	✓	✓
Sediment (Recovery Indicator Areas)	✓**		✓		✓

*Primary components are those identified as triggering metrics

**Sediment sampling will be performed in PDI

The Interim Remedy is Completely Consistent with EPA Guidance

2005 Sediment Guidance

- Take other early or interim actions, followed by monitoring before deciding on a final remedy
- Use adaptive management at complex sediment sites...test hypotheses, reevaluating assumptions as new information is gathered
- Phase in remedy selection where F&T is not well understood or there are significant implementation issues
- Consider separating management of source area from other areas

2017 OLEM Directive

- Consider early actions during RI/FS
- Develop achievable risk reduction expectations
- Consider the limitations of models
- Consider a structured adaptive management approach
- Use monitoring data to evaluate remedial effectiveness

2017 Superfund TF

- Strategy 2: Promote the application of adaptive management at complex sites and expedite cleanup through use of early/interim rods and removal actions
- Recommendation 3: Broaden the use of adaptive management (AM) at Superfund Sites

The Adaptive Remedy is Scientifically Supported and Certain to be Protective

- Certain:
 - Immediately reduces contaminant levels by an order of magnitude
 - Human Health & Ecological risks significantly & quickly reduced
 - Recovery will be accelerated
- Expected:
 - Meeting risk based cleanup goals in 20 years.
- Certain:
 - Post remediation monitoring will provide data needed to confirm recovery
 - If additional remediation is needed more will be done

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